Lloyd's Register

Rules and Regulations for the Classification of Ships, July 2011

Notice No. 7

Effective Date of Latest Amendments:

See page 1

Issue date: April 2012

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RULES AND REGULATIONS FOR THE CLASSIFICATION OF SHIPS, *July 2011*

Notice No. 7

This Notice contains amendments within the following Sections of the *Rules and Regulations for the Classification of Ships, July 2011.* The amendments are effective on the dates shown:

Part	***Chapter***	***Section***	***Effective date***
1	2	2	1 July 2012
1	2	2	Corrigendum
3	1	6	1 July 2012
3	2	1	1 July 2012
3	3	4	1 July 2012
3	8	5	1 July 2012
3	9	5	1 July 2012
3	10	2	1 July 2012
3	11	6, 9	1 July 2012
3	12	2, 4	1 July 2012
3	13	1	1 July 2012
3	16	8	1 July 2012
4	2	1, 6, 11	1 July 2012
4	4	6	1 July 2012
4	9	1, 12	1 July 2012
4	12	1, 2, 5, 6, 8	1 July 2012
6	2	11	1 July 2012
8	2	2, 6, 10	1 July 2012

It will be noted that the amendments also include corrigenda, which are effective from the date of this Notice.

The *Rules and Regulations for the Classification of Ships, July 2011* are to be read in conjunction with this Notice No. 7. The status of the Rules is now:

Rules for Ships	Effective date:	July 2011
Notice No. 1	Effective date:	1 July 2011
Notice No. 2	Effective date:	1 January 2012 & Corrigendum
Notice No. 3	Effective date:	1 January 2012
Notice No. 4	Effective date:	1 January 2012
Notice No. 5	Effective date:	1 July 2012
Notice No. 6	Effective date:	1 July 2012
Notice No. 7	Effective date:	1 July 2012 & Corrigendum

Part 1, Chapter 2
Classification Regulations

Effective date 1 July, 2012

■ *Section 2* Character of classification and class notations

2.1 Definitions

2.1.5 **Type notation**. A notation indicating that the ship has been arranged and constructed in compliance with particular Rules intended to apply to that type of ship~~, e.g. dredger~~. Type notations that may be assigned are listed in Table 2.2.1.

Table 2.2.1 Type notations

Dry cargo	Tanker	Passenger
Anchor handler AHTS (Anchor Handler Tug Ship) Barge Bulk carrier Container ship Diving support ship Dredger Escort tug Fire fighting Fishing vessel Hopper barge Hopper dredger Launch Livestock carrier Offshore supply Offshore tug Offshore well stimulation Ore carrier Pipe laying Pontoon Reclamation ship Refrigerated cargo ship Research Roll on-Roll off cargo ship Shipborne barge Standby ship Stern trawler Split hopper barge Split hopper dredger Trawler Tug Vehicle carrier	Chemical tanker Double hull oil tanker Liquefied gas carrier Liquefied gas tanker Oil barge Oil or bulk carrier Oil recovery ship Oil tanker Ore or oil carrier	Passenger ferry Passenger/vehicle ferry Passenger ship Roll on-Roll off passenger ship Sailing passenger ship

2.1.9 **Special features notation**. A notation indicating that the ship incorporates special features which significantly affect the design~~, e.g. movable decks.~~, *see* Table 2.2.2.

2.1.12 **Laid-up notation**. A ship not under repair or not actively employed may be assigned the laid-up notation in order to maintain the ship in class subject to agreement by the Classification Committee. A general examination of the hull and machinery is to be carried out in lieu of the Annual Survey. An Underwater Examination (UWE) is to be carried out in lieu of the Special Survey. *See* Ch 3,1.1.2, 2.1.5, 5.1.6 and 11.1.2.

Table 2.2.2 Special features notations (*see continuation*)

Special features notation	Description	*See also*
BC	Assigned to bulk carriers of length 150 m or above	Pt 4, Ch 7,1.4.2
Bottom Strengthened for (Operating Aground) (Loading and Unloading Aground)	Assigned where the bottom structure has been additionally strengthened for loading and unloading aground	Pt 3, Ch 9,8 and Pt 4, Ch 12,1.3.4
BLS	Bow Loading System. Assigned to tankers equipped with bow loading arrangements to facilitate the transfer of cargo oil from offshore loading terminals	Pt 7, Ch 6,1.2.1
Cargo Loading on (Tank Top/ Tween/ Deck (s) Plating/ Hatch cover(s)) limited to .... tonnes/m^2	Assigned where cargo loading on tank tops, decks and/or hatch covers are limited to a specified maximum value which is less than the normal Rule loading	—
Carriage of Oils with a F.P. not exceeding 60°C	Assigned to non-oil tankers where the ship is suitably constructed and arranged for the carriage of oils with a flash point not exceeding 60°C (closed cup test)	Pt 4, Ch 9 Pt 4, Ch 10
Carriage of Oils with a F.P. exceeding 60°C	Assigned where only the carriage of oils having a flash point exceeding 60°C (closed cup test) is contemplated	Pt 4, Ch 9,1.1.5
(Specified Cargo(es)) only	Assigned where arrangements have been approved for the carriage of a specific product(s)	Pt 4, Ch 9,1.1.7
c.c.	Assigned where structures are fitted with an approved corrosion control system	Chapter 3
CCSA	Certified Container Securing Arrangements. Assigned where freight container securing arrangements are fitted, and the design and construction of the system is in accordance with LR Rules and loose fittings are supplied	Pt 3, Ch 14
CG	Cargo Gear. Assigned where cargo gear is included in class at the Owner's request	Pt 3, Ch 9,6
CL	Cargo Lift(s). Assigned where cargo lift(s) are included in class at the Owner's request	Pt 3, Ch 9,6
CR	Cargo Ramp(s). Assigned where cargo ramp(s) are included in class at the Owner's request	Pt 3, Ch 9,6
CRC –/– –kW –%/–%	Carriage of refrigerated containers. The **CRC** notation may be applied to any ship which has the ability to carry refrigerated containers operating at their design condition with a 24-hour average external ambient air temperature of 35°C The following descriptive notations may be appended, giving details of electrical power and type of cargo: –/– No. of hold-stowed refrigerated containers/No. of deck-stowed refrigerated containers e.g. 230/140 –kW Power generating capacity dedicated to supplying the container plug-in points, e.g. 2,800 kW –%/–% Stowage ratio of deep frozen and chilled cargoes, e.g. 60%/40%	Pt 7, Ch 10,1.1
Container Cargoes in (((all) Hold (No(s)))(and on Upper Deck)((and on (all) Hatch Cover(s) (No(s))...)	Assigned where general cargo ships carry container cargoes.	Pt 3, Ch 4
Deck No(s) ... Strengthened for Carriage of Roll on-Roll off Cargoes	Assigned where it is proposed either to stow wheeled vehicles on the deck or to use wheeled vehicles for cargo handling and the deck and supporting structure has been specially considered	Pt 3, Ch 9,3
DSPM4	Dual Single Point Mooring. Assigned to a ship provided with a dual mooring line arrangement at a single-point mooring	Pt 3, Ch 13,8
Fire-Fighting Ship 1, 2, 3 (with water spray)	Designed where fire protection and fire-fighting equipment is provided. Type 1, 2 or 3 signifies the capacity of the fire-fighting equipment. The total discharge capacity of the monitors in m3/h is shown in brackets. ‘With water spray’ signifies that a ship is provided with a water spray system which will provide an effective cooling spray of water	Pt 7, Ch 3
Hatch Covers omitted in Hold (No(s)) ...	Assigned where the omission of hatch covers have been specially considered based upon the model tests or alternative means to determine the quantity of water likely to ingress the cargo holds and the means by which it is effectively and safely discharged	Pt 4, Ch 8,11.4

Table 2.2.2 Special features notations *(continued)*

Special features notation	Description	*See also*
Heavy Deck Loads	Assigned where decks are strengthened for loading in excess of Rule basic minimum, e.g. 'Upper deck aft of Fr. 50 strengthened for load of 10 tonnes/m^2'	Pt 3, Ch 6
Helicopter Landing Area	Assigned where a helicopter landing area is provided	Pt 3, Ch 9,5
Hold (No(s)) ... may be empty at draughts not (less than) (exceeding) ...m	Assigned where particular loading arrangements have been specially considered	Pt 4, Ch 7
Ice Class	Assigned where a ship is strengthened to navigate in specific ice conditions. Supplementary Ice Class notations are given in Table 2.2.3	Pt 8, Ch 1 and Ch 2
Icebreaker	Assigned designed for icebreaking duties	Pt 8, Ch 1 and Ch 2
LA	Mandatory Lifting Appliance(s). Assigned where the lifting appliance is considered to be an essential feature, e.g., cranes on crane barges, lifting arrangements for diving on diving support ships, and is mandatory	Pt 3, Ch 9,6
LFPL	Low Flashpoint liquids. Assigned to offshore supply ships intended for the carriage of liquids with flashpoint below 60°C (closed cup test) in bulk	Pt 4, Ch 4
For Liquefaction and Storage of (Methane, etc.) in Independent Gas Tanks (Type B, etc.), Maximum Vapour Pressure ( ) bar, Minimum Temperature Minus ( ) °C	Assigned where ships of Category 1B or 2 which have process plants installed solely for the purposes of the physical liquefaction of impure feedstock gases at low temperature and the storage of the purified liquefied gases (where the chemical treatment of the impurities is an incidental process)	Pt 7, Ch 2,2.2
Marpol 20.1.3	Assigned to double hull oil tankers not meeting the Rule minimum double side width requirements but which comply with MARPOL Annex 1, Regulation 20.1.3	Pt 4, Ch 9,1.4.3
Marpol 21.1.2	Assigned to double hull oil tankers of less than 5000 tonnes deadweight which have a complete double hull in accordance with MARPOL Annex I, Regulation 21.1.2	Pt 4, Ch 9,1.4.4
Movable Decks	Assigned where all movable decks comply with LR requirements. Movable decks other than those specifically indicated in LR Rule requirements are not a classification item	Pt 3, Ch 9,4
Oil Recovery	Assigned when a ship is equipped for oil recovery operations	Pt 7, Ch 5,2
Petrol in Hold (No(s))...	Assigned to ships that can carry motor vehicles with fuel in their tanks for self-propulsion, in specified locations. It does not apply to ships that are designed primarily for the carriage of motor vehicles Specific requirements will be advised upon request	—
PL	Passenger Lift(s). Assigned where the passenger lift(s) are included in class at the Owner's request	Pt 3, Ch 9,6
PM T1 [or T2 or T3] encircled	For ships fitted with a positional mooring system (PM). The supplementary notation T1 [or T2 or T3] encircled may be applied if the system is thruster-assisted. The encircled numeral defines the thruster allowance	Pt 7, Ch 8,1.2.1
PMC T1 [or T2 or T3] encircled	For ships fitted with a positional mooring system for mooring in close proximity to other ships or installations (PMC). The supplementary notation T1 [or T2 or T3] encircled may be applied if the system is thruster-assisted. The encircled numeral defines the thruster allowance	Pt 7, Ch 8,1.2.1
RD	Relative Density. Assigned where a ship has tanks appraised for a maximum permissible relative density greater than 1,025	Pt 4, Ch 1 Pt 4, Ch 4
Self-Discharging (Unloading)	Assigned where a ship fitted with self-unloading equipment whose structural aspect has been specially approved	Pt 4, Ch 12,1
SLS	Stern Loading System. Assigned to tankers equipped with stern loading arrangements to facilitate the transfer of cargo oil from offshore loading terminals	Pt 7, Ch 6,1
Specialised for the Carriage of ...	Assigned to a vessel which has been designed for the carriage of specified cargo other than that applied by the type notation	Pt 4, Ch 4,1
SPM4	Single Point Mooring. Assigned to a ship provided with a single mooring line arrangement at a single point mooring	Pt 3, Ch 13,8

Table 2.2.2 Special features notations (*conclusion*)

Special features notation	Description	*See also*
Strengthened for Heavy Cargoes ((any) Hold (No(s)) .... may be empty)	Assigned to a bulk carrier of less than 150 m in length or a ship designed for the carriage of heavy cargoes. If only certain holds are strengthened for heavy cargoes, they will be specified	Pt 4, Ch 1 and Pt 4, Ch 7,1
HNLS	Hazardous and noxious liquids system. Assigned to ships complying with the requirements for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk	Pt 4, Ch 4,8.1.6
Hold No(s) ... Strengthened for Regular Discharge by Heavy Grabs	Assigned to bulk carriers where cargoes are regularly discharged by heavy grabs and the thickness of the plating of the hold inner bottom, hopper and transverse bulkhead bottom stool is increased	Pt 3, Ch 9,9
Submersible to a depth of ...m below Upper Deck in Harbour only	Assigned to a ship that is designed so that it can be submersed to a specified depth in harbour only	—
Timber Deck Cargoes	Assigned where a cargo of timber is carried on an uncovered part of the freeboard or superstructure deck (does not include wood pulp or similar cargo) and the requirements of the 1966 Load Line Convention concerning timber deck cargoes or other National Regulations are complied with	Pt 3, Ch 9,2
TLS	Submerged Turret Loading System. Assigned to tankers equipped with submerged turret loading systems to facilitate the transfer of cargo oil from offshore loading to terminals	Pt 7, Ch 6,1
Winterisation	Assigned to a ship that is intended to navigate in cold climates and may be exposed to low temperatures that may cause equipment to freeze due to ice accretion from atmospheric icing or sea spray or due to freezing of liquid within a system. Protection measures are provided and operational procedures are specified to ensure that equipment is suitably protected to enable operation in low temperatures. Supplementary Winterisation notations are given in Table 2.2.3	Pt 8, Ch 1 and Ch 2
WDL(+)	Weather Deck Load. Assigned where the weather deck load scantlings have been approved for a loading greater than a design head of 3,5 m	Pt 4, Ch 1 and Ch 4

Table 2.2.3 Notations for ice and cold operations

Notation	Description	Conditions	Application	*See also*
Ice Class 1E	For offshore supply vessels	Light and very light ice conditions	Hull, Machinery	Pt 8, Ch 2,4 and Pt 8, Ch 2,5
Ice Class 1D	Hull strengthening in forward region only			
Ice Class 1C FS	Finnish Swedish Ice Class Rules	Ice Class 1C; ships with such structure, engine output and other properties that they are capable of navigating in light ice conditions, with the assistance of icebreakers when necessary;	Hull, Machinery	Pt 8, Ch 2,6 and Pt 8, Ch 2,7
Ice Class 1B FS		Ice Class 1B; ships with such structure, engine output and other properties that they are capable of navigating in moderate ice conditions, with the assistance of icebreakers when necessary		
Ice Class 1A FS		Ice Class 1A; ships with such structure, engine output and other properties that they are capable of navigating in difficult ice conditions, with the assistance of icebreakers when necessary		
Ice Class 1AS FS		Ice Class 1A Super; ships with such structure, engine output and other properties that they are normally capable of navigating in difficult ice conditions without the assistance of icebreakers		
Ice Class 1C FS(+)	Finnish Swedish Ice Class Rules with enhanced engine power for icebreaking capability	Ice Class 1C; ships with such structure, engine output and other properties that they are capable of navigating in light ice conditions, with the assistance of icebreakers when necessary	Hull, Machinery	Pt 8, Ch 2,8 and Pt 8, Ch 2,9
Ice Class 1B FS(+)		Ice Class 1B; ships with such structure, engine output and other properties that they are capable of navigating in moderate ice conditions, with the assistance of icebreakers when necessary		
Ice Class 1A FS(+)		Ice Class 1A; ships with such structure, engine output and other properties that they are capable of navigating in difficult ice conditions, with the assistance of icebreakers when necessary		
Ice Class 1AS FS(+)		Ice Class 1A Super; ships with such structure, engine output and other properties that they are normally capable of navigating in difficult ice conditions without the assistance of icebreakers		

Table 2.2.3 Notations for ice and cold operations

Notation	Description	Conditions	Application	*See also*
Ice Class PC7	IACS Polar Ship Rules	Summer/autumn operation in thin first-year ice which may include old ice inclusions	Hull, Machinery	Pt 8, Ch 2,10 and Pt 8, Ch 2,11
Ice Class PC6		Summer/autumn operation in medium first-year ice which may include old ice inclusions		
Ice Class PC5		Year-round operation in medium first-year ice which may include old ice inclusions		
Ice Class PC4		Year-round operation in thick first-year ice which may include old ice inclusions		
Ice Class PC3		Year-round operation in second-year ice which may include multi-year ice inclusions		
Ice Class PC2		Year-round operation in moderate multi-year ice conditions		
Ice Class PC1		Year-round operation in all Polar waters		
Winterisation H(*t*)	Hull construction materials	Low temperature operations	Hull, materials	Section 2 of the *Provisional Rules for the Winterisation of Ships*
Winterisation C(*t*)	Short duration		Equipment and systems	Section 3 of the *Provisional Rules for the Winterisation of Ships*
Winterisation B(*t*)	Seasonal duration			
Winterisation A(*t*)	Prolonged duration			

2.3 Class notations (hull)

2.3.13 **CSR**. This notation will be assigned to bulk carriers and double hull oil tankers compliant with the *IACS Common Structural Rules*, *see* Pt 4, Ch 7,1.2.1 and Ch 9,1.2.1. Additional mandatory and non-mandatory class notations for CSR bulk carriers are given in 2.3.14.

2.3.14 **Class notations for CSR bulk carriers**. In general, CSR bulk carriers less than 150 m in length are to comply with the requirements of 1.6, Pt 3, Ch 2 and the IACS *Common Structural Rules for Bulk Carriers* (CSR) and will be eligible for one of the following mandatory class notations:

{any holds may be empty}	This class notation is normally assigned to a ship designed to carry dry bulk cargoes of cargo density 1,0 tonne/m^3 and above, with an approved arrangement of loaded holds such that any hold may be empty at the maximum draught.
{holds a, b, ... may be empty}	This class notation is normally assigned to a ship designed to carry dry bulk cargoes of cargo density 1,0 tonne/m^3 and above with specified holds empty at maximum draught.

In general, CSR bulk carriers equal to or greater than 150 m in length are to comply with the requirements of 1.6, Pt 3, Ch 2 and the IACS *Common Structural Rules for Bulk Carriers* (CSR) and will be eligible for one of the following mandatory class notations:

BC-A, {holds a, b, … may be empty}	This class will be assigned for bulk carriers designed to carry dry bulk cargoes of cargo density 1,0 tonne/m^3 and above with specified holds empty at maximum draught.
BC-B	This class will be assigned for bulk carriers designed to carry dry bulk cargoes of cargo density 1,0 tonne/m^3 and above with all cargo holds loaded.
BC-C	This class will be assigned for bulk carriers designed to carry dry bulk cargoes of cargo density less than 1,0 tonne/m^3 with all cargo holds loaded.

The following additional notations and annotations are to be provided giving further detailed description of limitations to be observed during operation as a consequence of the design loading condition applied during the design:

(maximum cargo density (in tonnes/m^3))	For notations **BC-A** and **BC-B** if the maximum cargo density is less than 3,0 tonnes/m^3
(no MP)	For all notations when the vessel has not been designed for loading and unloading in multiple ports in accordance with the conditions specified in IACS *Common Structural Rules for Bulk Carriers* (CSR) Ch 4,7.3.3;

GRAB [X]	Where the net thickness of plating of inner bottom, hopper tank sloping plate, transverse lower stool, transverse bulkhead plating and inner hull up to a height of 3,0 m above the lowest point of the inner bottom, excluding bilge wells comply with IACS *Common Structural Rules for Bulk Carriers* (CSR) Ch 12,1 for **BC-A** and **BC-B**, *see* CSR Ch 1,1;
(allowed combination of specified empty holds)	Annotation for notation **BC-A**.

Existing paragraphs 2.3.14 *to* 2.3.18 *have been renumbered 2.3.15 to 2.3.19.*

2.3.20 **EU notations**. The following notations may be assigned to passenger ships that comply with the requirements of the European Council Directive 98/18/EC of 17 March 1998 on safety Rules and Standards for passenger ships, and subsequent revisions:

EU(A)	This class notation will be assigned to a passenger ship engaged on domestic voyages other than voyages covered by Classes B, C and D.
EU(B)	This class notation will be assigned to a passenger ship engaged on domestic voyages in the course of which it is at no time more than 20 miles from the line of coast, where shipwrecked persons can land, corresponding to the medium tide height.
EU(C)	This class notation will be assigned to a passenger ship engaged on domestic voyages in sea areas where the probability of exceeding 2,5 m significant wave height is smaller than 10 per cent over a one-year period for all-year-round operation, or over a specific restricted period of the year for operation exclusively in such a period (e.g. summer period operation), in the course of which it is at no time more than 15 miles from a place of refuge, nor more than 5 miles from the line of coast, where shipwrecked persons can land, corresponding to the medium tide height.
EU(D)	This class notation will be assigned to a passenger ship engaged on domestic voyages in sea areas where the probability of exceeding 1,5 m significant wave height is smaller than 10 per cent over a one-year period for all-year-round operation, or over a specific restricted period of the year for operation exclusively in such a period (e.g. summer period operation), in the course of which it is at no time more than 6 miles from a place of refuge, nor more than 3 miles from the line of coast, where shipwrecked persons can land, corresponding to the medium tide height.

2.3.21 The following notations may be assigned to ships that comply with standards for noise and vibration levels in different spaces at the time of delivery and during the ship's life if substantial changes to the machinery installation or interior arrangements are made. These notations are optional and are primarily intended to apply to passenger ships:

PAC	Passenger Accommodation Comfort. This notation indicates that the passenger accommodation meets the acceptance criteria.
CAC	Crew Accommodation Comfort. This notation indicates that the crew accommodation and work areas meet the acceptance criteria.
PCAC	Passenger and Crew Accommodation Comfort. This notation indicates that the passenger and crew spaces both meet the acceptance criteria.

Following the **PAC** or **CAC** notation, numerals 1, 2 or 3 will indicate the acceptance criteria to which the noise and vibration levels have been assessed. In the case of the **PCAC** notation, two numerals will be assigned. The first will indicate the acceptance criteria for passenger accommodation, whilst the second will indicate the crew comfort criteria.

2.3.22 The notation **EPN** (escort performance numeral) may be assigned to escort tugs which carry out full-scale performance trials in accordance with the requirements of Pt 4, Ch 3,9.3. **(F,B,V,C)** may be appended to the notations where:

F	Maximum steering force, in tonnes.
B	Maximum braking force, in tonnes.
V	Speed, in knots, at which F and B are determined.
C	Time, in seconds, required for the escort tug in manoeuvring from maintained oblique position of the tug giving it a maximum steering force on one side of the assisted vessel to a mirror position on the other side.

2.7 Descriptive notes

(*Part only shown*)

2.7.3 Where LR's ShipRight procedures for the following have been applied on a voluntary basis, then a descriptive note will, at the Owner's request, be entered in column 6 of the *Register Book*, preceded by the word **Shipright** (*see also ShipRight Procedures Overview*, Pt 3, Ch 16 and Pt 5, Ch 21):

~~**HPMS**~~	~~Hull Planned Maintenance Scheme~~

CORRIGENDUM

IHM *and* **VECS** *are two separate descriptive notes*

IHM	Inventory of Hazardous Materials (*Now Effective from 1 July 2012*)
VECS	Vapour Emission Control System This notation will be assigned to a ship that has a vapour emission control system fitted which has been designed and constructed in accordance with the requirements of USCG 46, CFR 39 or the IMO Standards for Vapour Emission Control Systems (MSC Circular 585). If a ship has been assigned the **ECO** notation then it will not be eligible for the **VECS** Descriptive Note. Instead, **VECS** will be referenced in the **ECO** notation, i.e. **ECO(VECS)**.

Effective date 1 July, 2012

2.9 Class notations (materials)

2.9.1 The following materials notations are associated with material properties and may be assigned by LR:

Z25	Steel grade with through thickness properties for normal ship applications, see Ch 3,8 of the *Rules for the Manufacture, Testing and Certification of Materials.*
Z35	Steel grade with through thickness properties for more severe applications, see Ch 3,8 of *Rules for the Manufacture, Testing and Certification of Materials.*

Part 3, Chapter 1

General

Effective date 1 July, 2012

■ *Section 6*
Definitions

6.1 Principal particulars

6.1.1 Rule length, *L*, is the distance, in metres, on the ~~summer load~~ waterline at draught *T*,from the forward side of the stem to the after side of the rudder post or to the centre of the rudder stock if there is no rudder post. *L* is to be not less than 96 per cent, and need not be greater than 97 per cent, of the extreme length on the ~~summer load~~ waterline. For ships without rudders, the Rule length is to be taken as 97 per cent of the extreme length on the ~~summer load~~ waterline. In ships with unusual stem or stern arrangements the Rule length, *L*, will be specially considered.

6.1.5 Draught, *T*, is the summer draught, in metres, measured from top of keel , or a greater value if such a value has been specified as 'scantling draught'. Both of the draughts are to be indicated on the midship plan, irrespective of whether or not they are of the same value.

(*Part shown only*)

6.1.6 The block coefficient, C_b, is the moulded block coefficient at draught, *T*, ~~corresponding to summer load waterline~~ based on Rule length, *L*, and moulded breadth, *B*, as follows:

6.1.7 Length between perpendiculars, L_{pp}, is the distance, in metres, on the ~~summer load~~ waterline at draught *T*, from the fore side of the stem to the after side of the rudder post, or to the centre of the rudder stock if there is no rudder post. In ships with unusual stern arrangements, the length, L_{pp}, will be specially considered. The forward perpendicular, F.P., is the perpendicular at the intersection of the ~~summer load~~ waterline with the fore side of the stem. The after perpendicular, A.P., is the perpendicular at the intersection of the ~~summer load~~ waterline with the after side of the rudder post. For ships without a rudder post, the A.P. is the perpendicular at the intersection of the waterline with the centreline of the rudder stock.

Part 3, Chapter 2

Materials

Effective date 1 July, 2012

■ *Section 1*
Materials of construction

1.2 Steel

Table 2.1.1 Values of k_L

Specified minimum yield stress in N/mm^2 (kgf/mm^2)	k_L
235 (24)	1,0
265 (27)	0,92
315 (32)	0,78
355 (36)	0,72
390 (40)	0,68 (0,66 *see* Note 3)
460 (47) *see* Note 3	0,62 *see* Note 3

NOTES
1. Intermediate values by linear interpolation.
2. For the purpose of calculating hull moment of inertia as specified in Ch 4,5.8.1, k_L = 1,0.
3. Grade only applies to thickness above 50 mm for decks and hatch coamings of container ships. The requirements specified in Ch 3,3 of the Rules for Materials apply, *see* 1.2.4 and 1.2.5.

1.2.5 For container ships only, a k_L factor of 0,66 may be applied to steel with a specified minimum yield stress of 390 N/mm^2 (40 kgf/mm^2), or a k_L factor of 0,62 may be applied to steel with a specified minimum yield stress of 460 N/mm^2 (47 kgf/mm^2) for structural members that contribute to the ship's longitudinal strength, provided that:

(a) the member's plate or web thickness is greater than 50 mm;
(b) the requirements of 1.2.4 are satisfied; and
(c) a spectral fatigue assessment is carried out in accordance with *ShipRight Fatigue Design Assessment* (FDA level 3) procedure, to demonstrate that key structural details sensitive to the hull girder loads have satisfactory fatigue performance. The assessment should normally include the following:
    - Hatch corners in way of cross-deck strips;
    - Hatch corners at the forward region;
    - Hatch corners forward and aft of the engine room and the accommodation blocks;
    - Connection of hatch coaming to supporting structure; and
    - Other critical locations subject to dynamic hull girder bending and torsional effects.

In addition, the ShipRight Construction Monitoring (CM) procedure is to be applied to the fatigue critical locations described above.

Existing paragraph 1.2.5 *has been renumbered* 1.2.6.

Part 3, Chapter 3

Structural Design

Effective date 1 July, 2012

■ *Section 4*
Bulkhead requirements

4.7 Protection of tanks carrying oil fuel, lubricating oil, vegetable or similar oils

(*Part only shown*)

Table 3.4.2 Oil fuel tank boundary requirements

~~NOTE~~ NOTES
1. However, for individual tanks with an oil fuel capacity of less than 500 m^3, the minimum distance is 0,76 m.
2. Oil fuel tanks with a maximum individual capacity not greater than 30 m^3 need not comply with the requirements of this Table, provided the aggregate capacity of such excluded tanks is not greater than 600 m^3.
3. Suction wells in oil fuel tanks may protrude into the double bottom below the boundary line defined by the distance d_b, provided that such wells are as small as practicable and the distance between the well bottom and the bottom shell plating is not less than 0,5d_b.

Part 3, Chapter 8

Superstructures, Deckhouses and Bulwarks

Effective date 1 July, 2012

■ *Section 5*

Bulwarks, guard rails and other means for the protection of crew

5.3 Freeing arrangements

(*Part only shown*)

5.3.22 In ships having superstructures which are open at either or both ends to wells formed by bulwarks on the open deck, adequate provision for freeing the open spaces are to be provided as follows:

The freeing port area, A_s for the open superstructure:

h_s = one standard superstructure height, *see* 1.3.2

h_b = actual height of the bulwark, in metres.

A_c = bulwark height correction factor taken as;

= 0 for bulwarks between 0,9 and 1,2 m in height

$= l_w \left(\dfrac{(h_b - 1{,}2)}{0{,}1} \right) (0{,}004)\ \text{m}^2$ for bulwarks of height greater than 1,2 m, and

$= l_w \left(\dfrac{(h_b - 0{,}9)}{0{,}1} \right) (0{,}004)\ \text{m}^2$ for bulwarks of height less than 0,9 m.

To adjust the freeing port area for the distance of the well deck above the freeboard deck, for decks located more than $0{,}5h_s$ above the freeboard deck, multiply by the factor $0{,}5\ (h_s/h_w)$.

Part 3, Chapter 9

Special Features

Effective date 1 July, 2012

■ *Section 5*

Helicopter landing areas

5.4 Landing area plating

(*Part only shown*)

5.4.1 The deck plate thickness, t, within the landing area is to be not less than:

P_h ~~P~~ = the maximum all-up weight of the helicopter, in tonnes

P_w = landing load~~,~~ on the tyre print in tonnes;
for helicopters with a single main rotor, P_w is to be taken as ~~P~~ P_h divided equally between the two main undercarriage~~s~~ wheels
for helicopters with tandem main rotors, P_w is to be taken as ~~P~~ P_h distributed between all main undercarriage~~s~~ wheels in proportion to the static loads they carry.
For helicopters fitted with landing gear consisting of skids, P_w is to be taken as P_h distributed in accordance with the actual load distribution given by the airframe manufacturer. If this is unknown, P_w is to be taken as $1/6P_h$ for each of the two forward contact points and $1/3P_h$ for each of the two aft contact points. The load may be assumed to act as a 300 mm x 10 mm line load at each end of each skid when applying Fig. 9.3.1.

γ = a location factor given in Table 9.5.1.

~~The~~ For wheeled undercarriages, the tyre print dimensions specified by the manufacturer are to be used for the calculation. Where these are unknown, it may be assumed that the print area is 300 x 300 mm and this assumption is to be indicated on the submitted plan.

For skids and tyres with an asymmetric print, the print is to be considered oriented both parallel and perpendicular to the longest edge of the plate panel and the greatest corresponding value of α, taken from Fig. 9.3.1.

~~*5.4.3* For helicopters fitted with landing gear consisting of skids, the print dimensions specified by the manufacturer are to be used. Where these are unknown, it may be assumed that the print consists of a 300 mm line load at each end of each skid, when applying Fig. 9.3.1.~~

5.5 Deck stiffening and supporting structure

5.5.1 The helicopter deck stiffening and the supporting structure for helicopter platforms ~~is~~ are to be designed for the load cases given in Table 9.5.2 in association with the permissible stresses given in Table 9.5.3. The helicopter is to be positioned so as to produce the most severe loading condition for each structural member under consideration.

Table 9.5.2 Design load cases for deck stiffening and supporting structure

Loadcase	Loads			
	Landing area		Supporting structure (*See* Note 1)	
	UDL, in kN/m^2 (tonne-f/m^2)	Helicopter patch load (*See* Note 2)	Self weight	Horizontal load (*See* Note 2)
(1) Overall distributed loading	2	—	—	—
(2) Helicopter emergency landing	~~0,2~~ 0,5 ~~(0,02)~~ (0,05)	2,5~~*P*~~ $P_{\mathrm{w}} f$	~~*W*~~ W_{h}	0,5~~*P*~~ P_{h}
(3) Normal usage	0,5 ~~(0,5)~~ (0,05)	1,5~~*P*~~ P_{w}	~~*W*~~ W_{h}	0,5~~*P*~~ P_{h} + 0,5~~*W*~~ W_{h}

Symbols

~~*P*~~ P_{h}, P_{w} as defined in 5.4.1
UDL = Uniformly distributed vertical load over entire landing area~~, kN/m^2 (tonne-f/m^2)~~
~~*W*~~ W_{h} = structural self-weight of helicopter platform

NOTES
1. For the design of the supporting structure for helicopter platforms, applicable self weight and horizontal loads are to be added to the landing area loads.
2. The helicopter is to be so positioned as to produce the most severe loading condition for each structural member under consideration.

Part 3, Chapter 10

Welding and Structural Details

Effective date 1 July, 2012

■ *Section 2*
Welding

2.2 Fillet welds

2.2.7 Double continuous fillet welding is to be adopted in the following locations, and may be used elsewhere if desired:

(a) Boundaries of weathertight decks and erections, including hatch coamings, companionways and other openings.
(b) Boundaries of tanks and watertight compartments.
(c) All structure in the after peak and the after peak bulkhead stiffeners.
(d) All welding inside tanks intended for chemicals or edible liquid cargoes.
(e) All lap welds in tanks.
(f) Primary and secondary members to bottom shell in the 0,3*L* forward.
(g) Primary and secondary members to plating in way of end connections, and end brackets to plating in the case of lap connections.
(h) Where 2.2.5 applies.
(j) All water ballast tanks.
~~(j)~~ (k) Other connections or attachments, where considered necessary, and in particular the attachment of minor fittings to higher tensile steel plating.

Part 3, Chapter 11

Closing Arrangements for Shell, Deck and Bulkheads

Effective date 1 July, 2012

Section 6

Miscellaneous openings

6.5 Side scuttles, windows and skylights

6.5.24 Laminated toughened safety glass may also be used for windows but the total thickness will need to be greater than that required for the equivalent sized window using toughened safety glass. The equivalent thickness of laminated toughened safety glass is to be determined from the following formula:

$$T_{L1}^2 + T_{L2}^2 + ...T_{Ln}^2 = T_S^2$$

where:

n = number of laminates
T_L = thickness of glass laminate
T_S = thickness of toughened safety glass~~.~~

Alternative arrangements that do not meet the above thickness requirement will be specially considered, provided that equivalent strength and bending stiffness to that of a single, thermally toughened pane of thickness, t_s, can be demonstrated in a four-point bending test in accordance with EN-ISO 1288-3 or an equivalent recognised National or International Standard, using not less than ten samples. The lower limit of the 90 per cent confidence level interval for the laminated pane shall not be less than the same for monolithic toughened safety glass. Small scale punch test or ring-in-ring test methods shall not be used.

Section 9

Watertight doors in bulkheads below the freeboard deck

9.2 Watertight doors

9.2.4 Watertight doors of the sliding type are to be capable of being operated ~~by efficient hand operated gear~~, both at the door itself and from an accessible position above the bulkhead deck. Means are to be provided at all the remote operating ~~position~~ positions to indicate whether the door is open or closed. ~~The lead of shafting is to be as direct as possible and the screw is to work in a gunmetal nut, *see also* Ch 3,4.8.~~ Doors are to be capable of being remotely closed by power from the bridge. The relevant regulations regarding openings in watertight bulkheads, contained in the *International Convention for the Safety of Life at Sea, 1974* and applicable amendments, are also to be complied with.

Part 3, Chapter 12

Ventilators, Air Pipes and Discharges

Effective date 1 July, 2012

Section 2

Ventilators

2.3 Closing appliances

2.3.9 In order to limit the fire growth potential in every space of the ship, the main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate whether the inlet or outlet is open or closed. Battery room ventilators are only to be fitted with a means of closing, whenever:

(a) the battery room does not open directly on to an exposed deck; or
(b) the ventilation opening for the battery room is required to be fitted with a closing device according to the Load Line Convention; or
(c) the battery room is fitted with a fixed gas fire extinguishing system.

Where a battery room ventilator is fitted with a closing device *see* Pt 6, Ch 2,11.5.2.

Section 4

Scuppers and sanitary discharges

4.1 General

4.1.3 Where the freeboard is such that the freeboard deck edge is immersed when the ship heels 5° or less, scuppers and discharges which drain spaces below the freeboard deck, or spaces within intact superstructures or deckhouses on the freeboard deck fitted with efficient weathertight doors, ~~may~~ are to be led to the bilges in the case of scuppers or to suitable sanitary tanks in the case of sanitary discharges. Where the freeboard is such that the freeboard deck edge is immersed when the ship heels greater than 5° then they ~~are to~~ may be led overboard and fitted with means of preventing water from passing inboard in accordance with 4.2.

Part 3, Chapter 13

Ship Control Systems

Effective date 1 July, 2012

■ *Section 1*
General

1.4 Podded propulsion

1.4.1 Where podded propulsion is included in the class of a ship, additional requirements as detailed in Pt 5, Ch 9 are to be complied with, as applicable.

Existing sub-Section 1.4 *has been renumbered* 1.5.

Part 3, Chapter 16

Construction and Lifetime Care of Ships

Effective date 1 July, 2012

~~■ *Section 8*~~
~~Hull planned maintenance~~

~~8.1 Descriptive note HPMS~~

~~*8.1.1* Where an Owner operates an approved Planned Maintenance Scheme as part of the Continuous Survey Hull (CSH) Cycle, the descriptive note **HPMS** will, at the Owner's request, be entered in column 6 of the *Register Book*.~~

~~*8.1.2* The descriptive note will indicate that procedures and documentation are in place to control and record the inspection of selected hull survey items by suitably qualified and trained personnel.~~

~~*8.1.3* For the requirements and approval procedures, see the appropriate procedures in the *ShipRight Procedures Overview*.~~

Existing Sections 9 *to* 11 *have been renumbered* Sections 8 to 10.

Part 4, Chapter 2

Ferries, Roll on-Roll off Ships and Passenger Ships

Effective date 1 July, 2012

■ *Section 1*
General

1.1 Application

1.1.1 This Chapter applies to sea-going roll on-roll off cargo ships, passenger ~~ships and~~ ships, sailing passenger ships and passenger yachts, defined as follows:

(a) A passenger ferry is defined as a ship specially designed and constructed for the carriage of passengers on a regular scheduled service between specified ports operating in reasonable weather conditions.

(b) A passenger/vehicle ferry is defined as a ship specially designed and constructed for the carriage of passengers and vehicles on a regular scheduled service between specified ports operating in reasonable weather conditions.

(c) A roll on-roll off cargo ship is defined as a ship specially designed and constructed for the carriage of vehicles, and cargo in pallet form or in containers, and loaded/unloaded by wheeled vehicles.

(d) A passenger ship is defined as a ship specially designed and constructed for the carriage of more than 12 passengers.

(e) A sailing passenger ship is defined as a ship specially designed and constructed for the carriage of more than 12 passengers and incorporating sail devices which are intended to be the primary means of propulsion.

(f) A passenger yacht is defined as a yacht that is specially designed and constructed in accordance with Administration requirements for passenger yachts with due regard to the applicability of the conventions as given in Pt 1, Ch 2,1.1.9, as determined in accordance with the British Red Ensign Group *Code of Practice for Yachts Carrying 13 to 36 Passengers (Passenger Yacht Code)*, and subsequent revisions.

1.3 Class notations

1.3.1 In general, ships complying with the requirements of this Chapter will be eligible to be classed:

‘**100A1 passenger ferry**’, or
‘**100A1 passenger/vehicle ferry**’, or
‘**100A1 roll on-roll off cargo ship**’, or
‘**100A1 roll on-roll off passenger ship**’, or
‘**100A1 vehicle carrier**’, or
‘**100A1 passenger ship**’, or
‘**100A1 passenger yacht**’, or
‘**100A1 sailing passenger ship**’.

■ *Section 6*

Double bottom

6.1 General

~~*6.1.1* In passenger ships (*see* 1.1) a double bottom is to be fitted extending from the forepeak bulkhead to the afterpeak bulkhead as far as this is practicable and compatible with the design and proper working of the ship, however:~~

~~(a) In ships of 50 m and upwards but less than 61 m in length a double bottom is to be fitted at least from the machinery space to the forepeak bulkhead, or as near thereto as practicable.~~

~~(b) In ships of 61 m and upwards but less than 76 m in length a double bottom is to be fitted at least outside the machinery space, and is to extend to the fore and after peak bulkheads, or as near thereto as practicable.~~

~~(c) In ships of 76 m in length and upwards, a double bottom is to be fitted amidships, and is to extend to the fore and after peak bulkheads, or as near thereto as practicable.~~

~~(d) A double bottom need not be fitted in way of watertight compartments of moderate size used exclusively for the carriage of liquids, provided the safety of the ship, in the event of bottom or side damage, is not impaired.~~

~~(e) Subject to the provisions stipulated in the relevant Regulations of the *International Convention for the Safety of Life at Sea, 1974* including the 1981 amendments, any deviations from the above requirements will be specially considered.~~

6.1.1 A double bottom is to be fitted in accordance with Pt 4, Ch 1,8.

~~*6.1.2* Where a double bottom as required by 6.1.1 is fitted, its depth is to be compatible with the requirements of Ch 1,8 and the inner bottom is to be continued out to the ship’s sides in such a manner as to protect the bottom to the turn of bilge. Such protection will be deemed satisfactory if the line of intersection of the outer edge of the margin plate with the bilge plating is not lower at any part than a horizontal plane passing through the point of intersection with the frame line amidships of a transverse diagonal line inclined at 25° to the base line and cutting it at a point one-half the ship’s moulded breadth from the middle line, *see* Fig. 2.6.1.~~

~~*6.1.3* Small wells constructed in the double bottom in conjunction with drainage arrangements of holds, etc., are not to extend downwards more than necessary. The depth of the wells is to be at least 460 mm less than the depth of the double bottom at the centreline, and the well is not to extend below the horizontal plane referred to in 6.1.2. A well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel. Other well arrangements (e.g. for lubricating oil under main engines) will be considered provided they give protection equivalent to that afforded by the double bottom.~~

Existing paragraph 6.1.4 *has been renumbered* 6.1.2.

■ *Section 11*

Miscellaneous openings

11.3 Strength assessment of windows in large passenger ships

11.3.4 Toughened safety glass of laminated construction will also be accepted, provided the requirements of Pt 3, Ch 11,6.5.24 are complied with.

11.4 Frame design and testing

11.4.2 **Water tightness**. A hydrostatic test is to be carried out in order to examine water tightness. This is carried out by applying the design pressure head H_d, as calculated in Section 11.3, to the external face of the window and maintained at this level for at least 15 minutes.

11.4.3 **Structural testing**. A hydrostatic test is to be carried out in order to examine the capability of the frame, mullions and glass retaining arrangements. This is carried out by applying a test pressure of $4H_d$ (H_d as calculated in Section 11.3) to the external face of the window. Alternatively this test may be carried out using a steel plate in place of the glass. Ideally, the steel plate ~~thickness~~ should be of a suitable reduced thickness in order to simulate the flexural performance of the glass.

11.5 Bonded windows and side scuttles

11.5.1 A ‘bonded window’ or ‘bonded side scuttle’ is one in which the glazing material is secured in its frame from outside of the ship by glue or other adhesive material. No mechanical fixing is provided for the glazing. Bonded windows and side scuttles are to comply with the requirements of Section 11. Proposals to secure glazing from the inside of the ship are to be specially considered using the requirements in this Section as a basis. It should be noted that bonding from the inside is not recommended and where it is proposed, further testing will be required. Non-load bearing secondary bonded glazing, e.g. glazing to improve thermal insulation, is not required to comply with the requirements of this sub-Section.

11.5.2 The adhesive is to be flexible enough to support the glazing without holding it firm. The glue strip is to be elastic, with width and thickness designed to allow the glazing to move in both directions in the plane of the glazing without undue forces on the bonding or the substrate. The glass is to be free to settle under-load and not to be forced to follow deflections in the supporting structure. If substantial racking of the glazing opening under-load is expected, the bonding is to be designed to accommodate such deflections.

11.5.3 Bonded windows and side scuttles may be considered as acceptable, in general, depending on their position, size of vessel and applicable statutory requirements, noting the distinction between glazing and the frame, which may have different requirements.

11.5.4 Bonded windows are not permitted in galley areas, including glazing in galley doors (internal or external). They are not permitted on escape routes and evacuation routes where a fire rating is required. The fire integrity of bulkheads is not to be impaired.

11.5.5 Bonded windows and side scuttles are not acceptable on fire-fighting vessels, i.e. those with a fire-fighting notation.

11.5.6 The failure of laminated glass is considered to pose a lower risk to safety than that of single pane glass. In the event of breaking, laminated glass more readily holds together and tends not to break up into large sharp pieces. Therefore, in general, laminated glazing is preferred. When laminated glass is used, the sealant is to be compatible with the interlayer. Lamination thickness is to be in accordance with Pt 3, Ch 11,6.5.24. Special consideration will be given to single pane toughened safety glass.

11.5.7 The durability of the adhesive and the sealant in the long term marine environment is to be considered in the approval process. Adhesive is to be approved in accordance with Ch 14,2.15 of the Rules for Materials. The adhesive bead is to be resistant to or protected from UV radiation, either by an optically dense area at the edges of the glazing or by overlapping trim or UV shielding tape. The adhesive bead is to be resistant to or protected from fungal attack. Arrangements are to be in accordance with the adhesive manufacturer's published guidelines and relevant LR Rules.

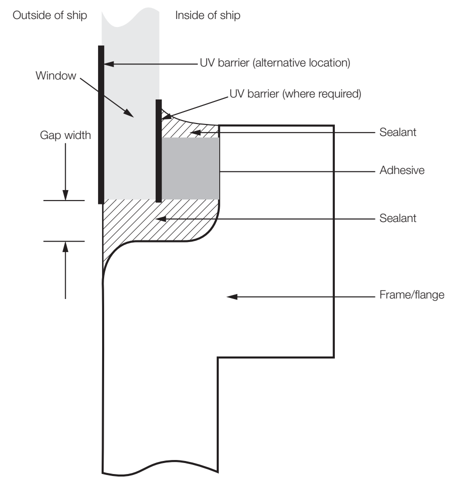

Fig. 2.11.1
Gap width between flange and window, bonded from outside of the ship

11.5.8 The edges of the bonding recess are to be rounded to facilitate the application of the sealant without air entrapment. The width of the gap between the flange and the glazing is to be large enough to accommodate the movement of the glazing as a result of hull deflection and thermal expansion, *see* Fig. 2.11.1. Recommended gap widths for bonded windows are to be taken as:

Gap width	Length of longest side of window
10–15 mm	<1,5 m
15–20 mm	1,5–3,0 m.

11.5.9 The minimum adhesive width and thickness are to be in accordance with the adhesive manufacturer's published guidelines.

Part 4, Chapter 4

Offshore Supply Ships

Effective date 1 July, 2012

■ *Section 6*

Miscellaneous openings

6.3 Windows and side scuttles

~~*6.3.12* On standby ships, windows larger than 1000 x 710 or an area greater than 0,71 m^2 are not acceptable, except in the after ends of deckhouses which are to be submitted for consideration in each case.~~

Part 4, Chapter 9

Double Hull Oil Tankers

Effective date 1 July, 2012

■ *Section 1*

General

1.1 General

~~*1.1.8* Where higher tensile steel is incorporated in principal structural members, a suitable descriptive note may be entered in the *Register Book*.~~

Existing paragraph 1.1.9 *has been renumbered* 1.1.8.

■ *Section 12*

~~Heated cargoes~~

Cargo temperatures

12.1 General

12.1.1 This Section applies to the carriage of heated and low temperature cargoes in vessels having a structural configuration as shown in Table 9.1.3 and Fig. 9.11.1.

12.4 Low temperature cargoes

12.4.1 The hull structural and engineering systems permit cargoes to be loaded down to –10°C. For temperatures below –10°C, hull structural assessment through temperature distribution and thermal stress calculations, as well as engineering systems analysis for the cargo lines/tanks and any precautions taken to minimise thermal shock or effects on associated systems (e.g. IG system), are to be provided. In addition, the cargo tank coating protection at low temperatures is to be confirmed, *see* 2.4. For low temperature operations, *see also* Part 8 and the *Provisional Rules for the Winterisation of Ships.*

Part 4, Chapter 12

Dredging and Reclamation Craft

Effective date 1 July, 2012

■ *Section 1*
General

1.3 Class notations

~~*1.3.2* These classes will be assigned to ships which are intended to make unrestricted sea-going voyages either as part of their work or while transferring from one work area to another as part of their normal operations. However, unrestricted sea-going service notations will not normally be assigned to bucket dredgers, nor to dredging and reclamation craft unless spoil spaces are provided with adequate hatch covers. Attention is drawn to the special requirements imposed by National Authorities involving loading limitations and stability requirements.~~

1.3.2 The class notations will be assigned to ships based on the following:

(a) The class notations in 1.3.1 will be assigned to ships which are intended to make unrestricted sea-going voyages, either as part of their work or while transferring from one work area to another as part of their normal operations and have also been designed to perform dredging operations in defined dredging service areas.

(b) Where dredger types listed in 1.3.1(a), 1.3.1(b) and 1.3.1(c) perform dredging operations at reduced freeboards, resulting in a dredging draught (T_m) greater than the summer draught and without a dredging service area restriction, the class notation will be extended as follows: **'dredging draught T_m of … metres in sea states with H_s <… metres'** and will be subject to special requirements of National Authorities, *see* 1.6.1 to 1.6.3.

(c) Where dredger types listed in 1.3.1(a), 1.3.1(b) and 1.3.1(c) perform dredging operations at reduced freeboards, resulting in a dredging draught (T_m) greater than the summer draught but with a dredging service area limited to within 21 nautical miles from shore, the class notation will be extended as follows: **'dredging within 21 miles from shore at a dredging draught T_m of … metres'** and will be subject to special requirements of National Authorities, *see* 1.6.1 and 1.6.2.

(d) Where requested, the assignment of more than one dredging draught may be considered, i.e. **'dredging at draught T_{m1}…'** and **'dredging at draught T_{m2}…'**, etc., provided agreement is obtained from the National Authorities and the applicable requirements of this Chapter are complied with.

1.6 Requirements for dredgers operating at reduced freeboards

1.6.1 Requirements of IMO DR 68 *Guidelines for the Operation of Dredgers at Reduced Freeboards* are to be complied with.

1.6.2 The dredger is to be of a self discharging type and equipped with bottom valves. When the ship is operating at a reduced freeboard, i.e. 1/2 or 1/3 of its summer freeboard, the capacity of these bottom valves, or a part thereof, is to be sufficient to obtain the summer freeboard by discharging the appropriate amount of cargo within 8 minutes (IMO DR 68 refers).

1.6.3 Where the class notation **'dredging draft T_m of … metres in sea states with H_s <… metres'** is assigned, the Master is to be provided with suitable information on the actual situation of the sea conditions and the forecast in terms of significant wave heights.

■ *Section 2*
Longitudinal strength

2.4 Design vertical wave bending moments

2.4.2 The design hull vertical wave bending moment at amidships for dredging conditions, M_{wd}, where draught T_m ~~exceeds~~ is greater than T, is given by the following expression:

~~$M_{wd} = 0{,}56 f_2 M_{wo}$~~

$$M_{wd} = f_{wd} f_2 M_{wo}$$

where

M_{wo} is determined from Pt 3, Ch 4,5.2, using C_{bm} in place of C_b ~~and~~

f_2 is given in Pt 3, Ch 4,5.2~~.~~

f_1 and f_{wd} are defined in Table 12.2.1.

~~**Table 12.2.1 Ship service factor f_1**~~

~~f_1~~		
~~'100A1'~~	~~'100A1 extended protected waters service'~~	~~'A1 protected water service'~~
~~0,75~~	~~0,70~~	~~0,65~~

Table 12.2.1 Ship service factors f_1 and f_{wd}

Class Notation	f_1	f_{wd}
+ 100A1…, dredging draught T_m of … metres in sea states with H_s <… metres	1,00	f_{uds}
+100 A1…, dredging within 21 miles from shore at a dredging draught T_m of … metres	0,75	0,60
+A1…, Protected waters service	0,65	0,35
Symbols		
f_{uds} = $2{,}2 H_s L^{-0{,}48}$, not to be taken less than 0,35 nor greater than 1 H_s = significant wave height for the dredging operations at the considered dredging draught T_m		
NOTE The wave reduction factors may only be used for dredgers complying with the applicable requirements of 1.6.1 to 1.6.3.		

2.7 Hull shear strength

2.7.3 The vertical wave shear forces, Q_w, are to be calculated in accordance with Pt 3, Ch 4,6. In dredging conditions, where the dredging draught T_m is greater than T, K_2 may be taken as f_{wd}.

■ *Section 5*
Shell envelope framing

5.1 Longitudinal stiffening

(*Part only shown*)

Table 12.5.1 Longitudinal stiffening

Position of longitudinals	Modulus
(1) Bottom	$\cancel{Z = \frac{l_e^2 s H}{K_1} c}$ $Z = \frac{l_e^2 s H k c}{K_1}$ cm^3 where l_e = effective span of longitudinals, in metres, and is to be taken as not less than 1,85 m except as provided for in 6.3.1 In way of single bottoms $H = D$ In way of double bottoms H = D on ships classed **100A1** or **100A1 extended protected waters service** = T_m for ships classed **A1 protected waters service** c = a factor varying from 1,0 at $\frac{D}{2}$ to = $\frac{2060}{3620 - 1560 F_B}$ at bottom, intermediate values by interpolation. For ships with hogging still water bending moments in loaded conditions and for split hull vessels, c = 1,0 F_B = as defined in Pt 3, Ch 4,5.1 K_1 = 120 on ships classed **100A1** or **100A1 extended protected waters service** = 150 on ships classed **A1 protected waters service** k = higher tensile steel factor, *see* Pt 3, Ch 2,1

■ *Section 6*
Bottom structure

6.6 Double bottom with longitudinal framing

6.6.1 In locations other than below spaces intended for dredged spoil the section modulus of inner bottom longitudinals is to be not less than:

$$\cancel{Z = \frac{l_e^2 s H}{K_1} c} \quad Z = \frac{l_e^2 s H k c}{K_1} \text{ cm}^3$$

where

l_e = effective span of longitudinals, in metres, and is to be taken as not less than 1,85 m
s = spacing of longitudinals, in mm
H = height, in metres, from the tank top to the deck at side, (but need not exceed T_m on ships classed **A1 protected waters service**)
c as defined in Table 12.5.1
K_1 = 120 in machinery spaces on ships classed **100A1**
= 150 otherwise
k = higher tensile steel factor, *see* Pt 3, Ch 2,1.

■ Section 8
Spoil space and well structure

8.1 Symbols and definitions

(*Part only shown*)

8.1.1 The symbols used in this Section are defined as follows:

ρ_{ef} = effective specific gravity to be taken, as defined in Table 12.8.1

Table 12.8.1 Effective specific gravity

Effective specific gravity less than or equal to 1,4	Effective specific gravity greater than 1,4	
$\rho \leq 1,4$	$\rho > 1,4$	
	for vertical boundaries	for boundaries which have an angle, a with the horizontal plane
$\rho_{ef} = \rho$	$\rho_{ef} = 1,4$	$\rho_{ef} = 1,4 + (\rho - 1,4)(\cos\alpha)^2$

Table ~~12.8.1~~ 12.8.2 Definition of *c* for longitudinal framing

Symbols	Location	*c, see* Note 2	
		~~longitudinal framing~~	
F_B as defined in Pt 3, Ch 4,5.1	*0,8D* $\frac{D}{2}$ and above	1,0	
	At $\frac{D}{2}$	0,85	
	0,2*D* above base (*see* Note 1)	$\frac{550}{1590 - 1040F_B}$	~~intermediate values by interpolation~~
	Base line (*see* Note 1)	$\frac{2060}{3620 - 1560F_B}$	

NOTES
1. For ships with hogging still water bending moments in loaded conditions and for split hull vessels, $c = 1,0$.
2. Intermediate values are to be calculated by linear interpolation.

8.3 Spoil space and well boundaries

8.3.1 The ~~minimum~~ plating thickness of spoil space boundaries is to be ~~the thickness required for deep tanks by Ch 1,9.2, or 8,5 mm, whichever is the greater.~~ not less than the following:

t = $0,0046 s f \sqrt{k h \rho_{ef}} + 3,0$ mm, or

t = 8,5 mm, whichever is the greater

In the case of grab dredgers the minimum thickness is to be 10 mm. These thickness requirements also apply to the plating of watertight box keels and inner bottom plating. The value of ~~ρ~~ ρ_{ef} used in the calculations and the height(s) of the overflow weir(s) are to be clearly shown on the midship section plan.

8.3.7 The ~~Section~~ section modulus of framing on spoil space boundaries is to be not less than:

$$\cancel{Z = \frac{0,0113 \rho s h l_e^2 c}{\gamma} \text{ cm}^3}$$

$$Z = \frac{0,0113 \rho_{ef} s h l_e^2 k c}{\gamma} \text{ cm}^3$$

where

~~c has the value given in Table 12.8.1 for longitudinal framing and c = 1,0 for transverse framing~~

c = as defined in Table 12.8.2 for longitudinal framing
= 1,0 for transverse framing

~~g~~ γ = 1,4 for rolled or built sections
= 1,6 for flat bars

ρ_{ef} = effective specific gravity, *see* 8.1.1

k = higher tensile steel factor, *see* Pt 3, Ch 2,1

The section modulus of longitudinals below $\frac{D}{2}$ is to be taken not less than the value obtained at $\frac{D}{2}$.

8.4 Cross-members

8.4.1 Cross-members are to be fitted within the hopper space in line with the bottom and side shell transverses and with the bulkheads in the side buoyancy spaces. ~~Cross-members need not be fitted at every frame, but their spacing is not to exceed 4,0 m.~~ Where the spacing between the cross-members exceeds 4 m, the scantlings of all primary members contributing to the continuity of the transverse strength in the spoil space are to be verified by direct calculations, *see also* Pt 3, Ch 1,2.3. Where a box keel is fitted on the centreline, webs are to be fitted within the box keel to ensure proper continuity of strength across the ship in way of the hopper cross-member. The webs required within centreline watertight box keels may have a thickness 3,5 mm less than that required for the hopper cross-members with which they are associated, but their minimum thickness is to be not less than 6,5 mm.

~~*8.4.7* Upper cross-members spanning hopper spaces at or above deck level are to be designed on the basis of actual loads carried, including dynamic factors if applicable, and 60 per cent fixity. Stresses are to be as follows:~~

~~Bending stress, σ_b is not to exceed:~~

~~74,5 N/mm² (7,6 kgf/mm²)~~

~~Shear stress, σ_s is not to exceed:~~

~~68,6 N/mm² (7,0 kgf/mm²)~~

~~Total stress, $\sigma_e = \sqrt{\sigma_b^2 + 3\sigma_s^2}$ and is not to exceed:~~

~~118 N/mm² (12 kgf/mm²)~~

~~The members should, in general, be connected to the centreline box keel by one or more pillars, where such a keel is fitted.~~

8.4.7 The transverse strength of primary structural members, such as upper and lower cross members and wing tank bulkheads, forming transverse ring systems are to be verified by direct calculations, e.g. finite element calculations on the basis of loads arising from hydrostatic, wave, spoil pressure and loadings on closing appliances of bottom openings. The stresses are in general not to exceed the following values:

Bending + axial stress (σ_b)	130/*k* N/mm^2
Shear stress (*T*)	70/*k* N/mm^2
Combined stress	180/*k* N/mm^2

where

k = higher tensile steel factor, *see* Pt 3, Ch 2,1.

Part 6, Chapter 2

Electrical Engineering

Effective date 1 July, 2012

■ *Section 11*
Batteries

11.5 Ventilation

11.5.1 Battery compartments and boxes are to be ventilated to avoid accumulation of dangerous concentrations of flammable gas. ~~The ventilation openings are to be of a non-closeable type, with the exception of closing devices in accordance with 11.5.2, and a permanent notice is to be prominently displayed adjacent to them, stating:~~

> ~~THIS VENTILATOR OPENING IS NOT TO BE CLOSED OR BLOCKED AT ANY TIME – EXPLOSIVE GAS.~~

11.5.2 ~~Closing devices in battery compartment ventilation openings are to be provided with a means to be locked open. A permanent notice is to be prominently displayed adjacent to each one to make clear that the closing device is only to be closed in the event of a fire.~~ Where a battery compartment ventilator is required to be fitted with a closing device in accordance with Pt 3, Ch 12,2.3.9, a warning notice clearly stating the purpose of the closing device, for example:

> 'This closing device is to be kept open and only closed in the event of a fire or flooding – Explosive gas atmosphere'

is to be provided at the closing device to mitigate the possibility of inadvertent closing of the ventilator. Furthermore, means to lock the battery compartment ventilators in the open position are to be provided.

Part 8, Chapter 2
Ice Operations – Ice Class

Effective date 1 July, 2012

■ *Section 2*
General hull requirements for navigation in ice – All Ice Classes

2.1 General

~~*2.1.3* Fresh water and sea water ballast tanks situated above the design ballast waterline and adjacent to the shell, which are intended to be used in ice and cold navigating conditions, are to be provided with means to prevent freezing. These measures are to provide protection so that pumping water will not cause a vacuum beneath a layer of ice across the top of the water in the tank, and, are to protect against structural and systems damage from ice expansion. The following tank heating requirements are to be complied with:~~

~~(a)~~ ~~For **Ice Class 1C**, **Ice Class 1D** and **Ice Class 1E**:~~
~~Tanks entirely above the waterline are to be provided with heating coils or continuous circulation.~~
~~Tanks partially below the waterline are to be provided with heating coils, continuous circulation or air bubbling.~~

~~(b)~~ ~~For all other **Ice Classes**:~~
~~All tanks entirely above and partially below the waterline are to be provided with heating coils.~~

2.1.3 Fresh water and sea-water ballast tanks, the tops of which are situated above the design ballast waterline and adjacent to the shell, which are intended to be used in ice and cold navigating conditions, are to be provided with means to prevent freezing. Measures are to be provided to demonstrate that they protect against the following:

(a) hull structural damage from pumping water creating a vacuum beneath a layer of ice across the top of the water in the tank, and
(b) hull structural damage from ice expansion, and
(c) engineering systems, such as piping systems and components, damage from ice expansion or ice blockage, and
(d) engineering systems, such as piping systems and components, damage from ice pieces melting or dislodging from upper sections of the tank.

Heating coils are considered an effective means for tanks entirely above the waterline. Heating coils or other effective means such as continuous circulation, air bubbling and/or tank pressure/engineering systems alarms are considered effective for tanks partially below the waterline. Alternatively, demonstration that the above hazards have been mitigated is to be submitted through theoretical calculations, service experience, experimental tests, or a combination thereof.

■ *Section 6*
Hull requirements for first-year ice conditions – Ice Classes 1AS FS, 1A FS, 1B FS, 1C FS and 1D

6.6 Renewal criteria within ice strengthening area for CSR ships

6.6.1 For double hull oil tankers and bulk carriers that are compliant with the *IACS Common Structural Rules for Double Hull Tankers and IACS Common Structural Rules for Bulk Carriers* respectively, the renewal criteria of the local structure for general corrosion is to be calculated in accordance with the applicable Common Structural Rules renewal criteria.

Existing sub-Section 6.6 *has been renumbered* 6.7.

■ *Section 10*
Hull strengthening requirements for navigation in multi-year ice conditions – Ice Classes PC1, PC2, PC3, PC4, PC5, PC6 and PC7

10.10 Framing – General

10.10.7 The actual net effective shear area, A_w, of a framing member is given by:

$$A_w = \frac{h\, t_{wn} \sin\varphi_w}{100} \text{ cm}^2$$

where

h = height of stiffener, in mm, *see* Fig. 2.10.4
t_{wn} = net web thickness, in mm
= $t_w - t_c$
t_w = as built web thickness, in mm, *see* Fig. 2.10.4
t_c = corrosion deduction, in mm, to be subtracted from the web and flange thickness (as specified ~~in Table 2.10.5, but not less than ts as required~~ by t_s in 10.16.3)
φ_w = smallest angle between shell plate and stiffener web, measured at the midspan of the stiffener, *see* Fig. 2.10.4. The angle φ_w may be taken as 90° provided the smallest angle is not less than 75°.

~~Table 2.10.5 Corrosion deductions for web and~~ flange thickness

Category		Corrosion deduction t_C, in mm
Ballast water tanks	Within 3 m below the top of tank, *see* Note	4,0
	Elsewhere	3,0
Cargo oil tanks	Within 3 m below the top of tank, *see* Note	4,0
	Elsewhere	2,5
Heated cargo oil tanks	Within 3 m below the top of tank, *see* Note	4,5
	Elsewhere	3,5
Void spaces	Spaces not normally accessed, e.g. access only via bolted manhole openings, pipe tunnels, etc.	2,0
Dry spaces	Internals of machinery spaces, pump room, store rooms, steering gear space, etc.	1,5

NOTE
Only applicable to cargo and ballast tanks with weather deck as the tank top.

Existing Tables 2.10.6 *to* 2.10.12 *have been renumbered* 2.10.5 *to* 2.10.11.

Cross-references

Section numbering in brackets reflects any Section renumbering necessitated by any of the Notices that update the current version of the Rules for Ships.

Part 1, Chapter 2

2.1.8	*Reference* 2.3.16 *now reads* 2.3.17

Part 3, Chapter 2

1.1.3	*Reference* 1.2.5 *now reads* 1.2.6

Part 4, Chapter 9

10.5.1	*Reference* 1.1.9 *now reads* 1.1.8

Part 8, Chapter 2

6.6.4 (***6.7.4***)	*Reference* 6.6.1 *now reads* 6.7.1
6.6.4	*Reference* 6.6.1 *now reads* 6.7.1
10.16.2	*Reference* Table 2.10.6 *now reads* Table 2.10.5
10.17.1	*Reference* Tables 2.10.8 *to* 2.10.11 *now reads* Tables 2.10.7 *to* 2.10.10
10.17.2	*Reference* Table 2.10.7 *now reads* Table 2.10.6 (twice)
10.17.3	*Reference* Table 2.10.7 *now reads* Table 2.10.6
10.17.4	*Reference* Tables 2.10.8 *to* 2.10.10 *now reads* Tables 2.10.7 *to* 2.10.9
10.17.5	*Reference* Table 2.10.11 *now reads* Table 2.10.10
10.22.1	*Reference* Table 2.10.12 *now reads* Table 2.10.11

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